



U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Instrument Flight Procedure
Validation (IFPV) of Satellite Based Instrument
Flight Procedures (IFP)

Date: 10/14/11
Initiated by: AFS-460

AC No: 90-113

1. Purpose. This advisory circular (AC) provides guidance for conducting instrument flight procedure validation (IFPV) of satellite-based performance-based navigation (PBN) instrument flight procedures (IFP) for both fixed-wing and helicopter aircraft. This AC also addresses validation of helicopter wide area augmentation system (WAAS) special IFP. This AC supplements and does not change the requirements of Federal Aviation Administration (FAA) Order 8200.1, United States Standard Flight Inspection Manual. It describes ground validation, preflight validation (including simulator evaluation and obstacle assessment), and flight validation.

2. Audience. The primary audience for this AC is non-governmental service providers performing IFPV. The secondary audience is Flight Standards Service Aviation Safety Inspectors and Air Traffic Organization personnel within the FAA who are directly associated with the FAA IFPV process and/or charged with the responsibility to authorize and provide oversight of non-governmental IFPV service providers.

3. Background. Historically, FAA Aviation System Standards (AVN) has conducted flight inspections of all new or revised IFP including an assessment of ground-based navigation aids (NAVAID), procedure flyability, obstacle verification, and airport/heliport infrastructure. The term “flight inspection” specifically refers to the evaluation and analysis of NAVAIDs and systems. The term “flight validation” refers to the flight assessment of an IFP to confirm that the procedure is operationally safe. Flight Validation verifies the required obstacle clearance, flyability, navigation database accuracy, design accuracy, and required infrastructure (i.e., communications, approach lights, runway markings, runway lights, charting, etc.) with all supporting documentation. Flight Validation is the final step in the IFPV process defined in this advisory circular.

Note: IFPV was previously referred to as flight validation. However, flight validation now refers to only one element of the IFPV process.

4. Definitions.

a. Accuracy codes are standards for horizontal and vertical obstacle measurements as outlined in the 8260.19, appendix C.

b. Airborne Obstacle Assessment. An assessment of obstacles considered to be of impact to the IFP performed from the air, conducted in accordance with FAA Order 8200.1. This

assessment may involve the verification of the controlling obstacle, the evaluation of obstacles or the identification of obstacles that are missing from, or not included in the IFP. Airborne obstacle assessment is conducted during the preflight validation phase of the IFPV process.

c. Area Navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground-based or space-based NAVAIDS or within the limits of the capability of self-contained aids, or a combination of these (see Pilot/Controller Glossary).

d. ARINC 424 is an international standard file format for the preparation and transmission of data for assembly of airborne navigation system data bases.

e. Autonomous Global Positioning System Recording System (AGRS). A positioning and recording system independent from the aircraft navigation system (and does not interfere with any aircraft system). The AGRS must be capable of the following: IFP storage, moving map display depicting the IFP course, and flight validation records including time and three-dimensional positions in space with a sampling rate of not less than one hertz. The AGRS must also be compliant with minimum operational performance specifications for the Global Navigation Satellite System (GNSS) equipment or system appropriate for route of flight or procedure. The AGRS system can be one stand-alone unit, or a series of components connected together (i.e., laptop, GNSS receiver, etc.) as long as it meets the minimum specifications outlined in current IFPV guidance.

f. FAA Flight Inspection System (FIS). The position recording and analysis system used by the FAA. It is independent from the aircraft navigation system used in flight inspection aircraft. The FAA FIS provides sufficient assessment and recording capabilities for flight validation.

g. Flight Inspection. In-flight investigation and evaluation of a NAVAID to determine whether It meets established tolerances (see Pilot/Controller Glossary).

h. Flight Validation. The flight assessment of a new or revised satellite-based PBN IFP to confirm that the procedure is operationally acceptable for safety, flyability, and design accuracy, including controlling obstacle identification, database verification, and documentation.

i. Flyability. A check or system of checks that ensure the procedure can be flown safely as designed. These checks may include, but are not limited to; acceptability of any deviations from standards, bank angles, airspeeds, climb/descent gradients, roll rates, track lengths, pilot workload issues, procedure complexity, runway alignment, etc.

j. Global Positioning System (GPS). A space-base radio positioning, navigation, and time-transfer system. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis, to an unlimited number of properly equipped users. The system is unaffected by weather, and provides a worldwide common grid reference system. The GPS concept is predicated upon accurate and continuous knowledge of the spatial position of each satellite in the system with respect to time and distance from a transmitting satellite to

the user. The GPS receiver automatically selects appropriate signals from the satellites in view and translates these into three-dimensional position, velocity, and time. System accuracy for civil users is normally 100 meters horizontally (see Pilot/Controller Glossary).

k. Ground Obstacle Assessment. An assessment of obstacles performed from the ground. This assessment involves the verification of the controlling obstacle, the evaluation of obstacles or the identification of obstacles that are missing from, or not included in the instrument flight procedure. Ground obstacle assessment is conducted during the preflight validation phase of the IFPV process.

l. Ground Validation. An in-depth quality assurance review of the development and documentation of a PBN IFP. Ground validation is the first step in the IFPV process. Issues identified during ground validation must be addressed prior to flight validation.

m. Instrument Flight Procedure (IFP). A description of a series of predetermined flight maneuvers by reference to flight instruments, published by electronic and/or printed means.

n. Instrument Flight Procedure Service Provider. An organization that provides IFP development services.

o. Instrument Flight Procedure Validation (IFPV). The final quality assurance step in the procedure development process for satellite-based PBN IFP. The purpose of IFPV is the verification of pertinent obstacle and procedural data as well as an assessment of the flyability of the procedure. IFPV is broken down into three elements: ground validation, preflight validation, and flight validation.

p. Instrument Flight Procedure Validation Evaluator. The evaluator is the individual responsible for conducting the IFPV activity and signing the respective FAA 8260-30 series form. Each IFPV activity requires a specific designation on the Letter of Authorization (LOA). Evaluators must complete the FAA Academy Flight Validation of Satellite-Based Performance-Based Instrument Flight Procedures course or equivalent, satisfactorily demonstrate IFPV to an FAA Aviation Safety Inspector, and have authorization from the Flight Technologies and Procedures Division (AFS-400).

q. Preflight Validation. This is an operational review of the PBN IFP. The preflight validation step of the IFPV process consists of a simulator evaluation (if required) to test the flyability of the procedure and an obstacle assessment (either ground-based or airborne) to validate obstacle data. The preflight validation provides a preliminary review of the elements that will be evaluated during the flight validation.

r. Public Instrument Flight Procedure (Public). An IFP published in Title 14 Code of Federal Regulations (14 CFR) part 97 and available to the general public.

s. Required Navigation Performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace (see Pilot/Controller Glossary).

t. Special Aircraft and Aircrew Authorization Required (SAAAR)/RNP Authorization Required (AR). A special authorization by the FAA to conduct RNP IFP designated as “Special Aircraft and Aircrew Authorization Required” or “Authorization Required.” Standards and criteria for development of RNP SAAAR/AR IFP are defined in FAA Order 8260.52 and based on aircraft equipage and additional aircrew requirements.

u. Special Instrument Flight Procedure (Special). An IFP approved by the FAA in accordance with specific guidelines but not published in 14 CFR part 97 for public use.

v. Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS). A software tool used to generate and evaluate terminal routes and conduct simulation and analysis.

w. Validation. The activity whereby the evaluator checks a data element as having a value that is fully applicable to the identity given to the data element, or a set of data elements, checked as being acceptable for their purpose.

x. Verification. The activity whereby the evaluator checks the current value of a data element against the value originally supplied.

5. Related Publications (current editions).

a. Regulations. Title 14 Code of Federal Regulations (14 CFR) Part 97.

b. Reference Material. These publications address IFP development and implementation:

(1) FAA Advisory Circular (AC) 90-101, Approval Guidance for RNP Procedures with SAAAR.

(2) FAA Advisory Circular (AC) 90-110, Authorization Guidance for Development of Required Navigation Performance Procedures with Authorization Required by Third Party Instrument Flight Procedure Service Providers.

(3) FAA Advisory Circular (AC) 90-111, Guidance for the Validation of Software Tools Used in the Development of Instrument Flight Procedures by Third Party Service Providers.

(4) FAA Advisory Circular (AC) 90-112, Development and Submission of Special Instrument Procedures to the Federal Aviation Administration.

(5) FAA Order 8200.1, United States Standard Flight Inspection Manual.

(6) FAA Order 8260.19, Flight Procedures and Airspace.

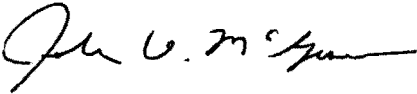
(7) FAA Order 8260.42, United States Standard for Helicopter Area Navigation (RNAV).

(8) FAA Order 8260.52, United States Standard for Required Navigation Performance (RNP) Approach Procedures with Special Aircraft and Aircrew Authorization Required (SAAAR).

(9) FAA Order 8260.54, United States Standard For Area Navigation (RNAV).

(10) FAA Order 8900.1, Flight Standards Information Management System (FSIMS), Volume 11, chapter 12.

(11) RTCA DO-236, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation.

A handwritten signature in black ink, appearing to read "John M. Allen".

John M. Allen
Director, Flight Standards Service

Appendix A. Instrument Flight Procedure Validation (IFPV) Overview

1. Authorization. All IFPV service providers must be authorized by the FAA prior to conducting any IFPV activities. Approval to conduct IFPV activities requires classroom training and on-site observation of company specific procedures for IFPV activities. Specific FAA authorization is required for flight validation, ground obstacle assessment, simulator evaluation, and airborne obstacle assessment. See FAA Order 8900.1, Volume 11, chapter 12 for examples of IFPV Letters of Authorization (LOA).

2. Process. The IFPV process is a series of actions involving several distinct elements, ground validation, preflight validation (including simulator evaluation and obstacle assessment), and flight validation. While IFPV is very efficient, it is critical that sufficient time be allotted to complete all tasks involved with IFPV.

3. Notification of planned IFPV activity. Service providers must notify the Flight Procedure Implementation and Oversight Branch (AFS-460) by email (AFS460IFPV@faa.gov) prior to conducting any IFPV activity. The operator must not perform the activity without AFS-460 approval. The operator must notify AFS-460 at least 15 business days prior to the intended activity date to allow for oversight planning.

4. Record Data Format. Records required by current IFPV guidance must be submitted electronically to AFS-460. Acceptable formats include Microsoft Word, Adobe Portable Document Format (PDF), TARGETS project files, National Marine Electronics Association (NMEA) text files, and/or Comma Separated Value (CSV) files. The preferred format is electronic transmittal of a TARGETS project file.

5. Data Accuracy and Sources. Satellite-based PBN IFP, RNAV (GPS), RNAV (RNP), and WAAS require highly accurate data based on the World Geodetic System of 1984 (WGS-84) geodetic datum. This requires all survey data used in the flight procedure to meet FAA Order 8260.19 standards. It is mandatory that an appropriate quality assurance system covering all domains of data collection (surveys), processing, publication, and navigation database development be maintained (Ref. ICAO Convention on International Civil Aviation Annexes 4, 11, 14, and 15). Input errors, particularly within the final approach segment (FAS) data block, can result in significant changes to the flight path in relation to the runway/point-in-space. The validation must ensure use of correct data for a valid flight procedure analysis. Sources of terrain, obstacle, and aeronautical data used, to include the source, type, date, version, and resolution of the data must be documented in accordance with FAA Order 8260.19.

6. Library. A current copy of all relevant FAA documents and IFPV Service Provider operations manuals, publications, and correspondence pertinent to IFPV must be maintained by the service provider. Libraries may be maintained in electronic format and must contain at a minimum, the publications listed in paragraph 5 of the AC.

7. Records. IFPV Service Providers must maintain records of the items listed below. All records must be maintained for two years after an IFP is canceled and must be made available to the FAA for audit purposes on request. The FAA Aviation System Standards Flight Inspection record keeping policy meets the requirements listed below:

a. Obstacle assessment records.

b. Detailed survey reports.

c. AGRS recordings from ground and/or airborne obstacle assessment and flight validation activities.

(1) Furnish the AGRS electronic file (compatible with FAA computer systems) from both the obstacle assessment and the flight validation to AFS-460.

(2) Submit the report in conjunction with the procedure package. The report must contain at a minimum the following elements:

- (a) Processing date and time;
- (b) Maximum number of satellites;
- (c) Minimum number of satellites;
- (d) Average Position Dilution of Precision (PDOP);
- (e) Vertical Protection Level (VPL) [WAAS Procedures only];
- (f) Maximum Observed Horizontal DOP (HDOP) [WAAS Procedures only];
- (g) Horizontal Protection Level (HPL) [WAAS Procedures only];
- (h) Maximum Observed Vertical DOP (VDOP) [WAAS Procedures only];
- (i) For each segment, the maximum and minimum altitude, ground speed, climb rate, and climb gradient,
- (j) A printed graphic of sufficient detail that depicts the flight track flown referenced to the desired track of the approach procedure, including procedure fixes.

d. For Helicopter IFP utilizing FAS data block (WAAS), a documented analysis of the FAS data in relation to the landing threshold point or desired point-in-space for course error, glide path error, threshold crossing height error, and the cyclic redundancy code (CRC). Fixed-wing WAAS IFP is not addressed in this document.

e. FAA Forms 8260-30A/B/C for all IFPV activities.

(1) Include all of the original forms in the initial procedure package submitted to AFS-460.

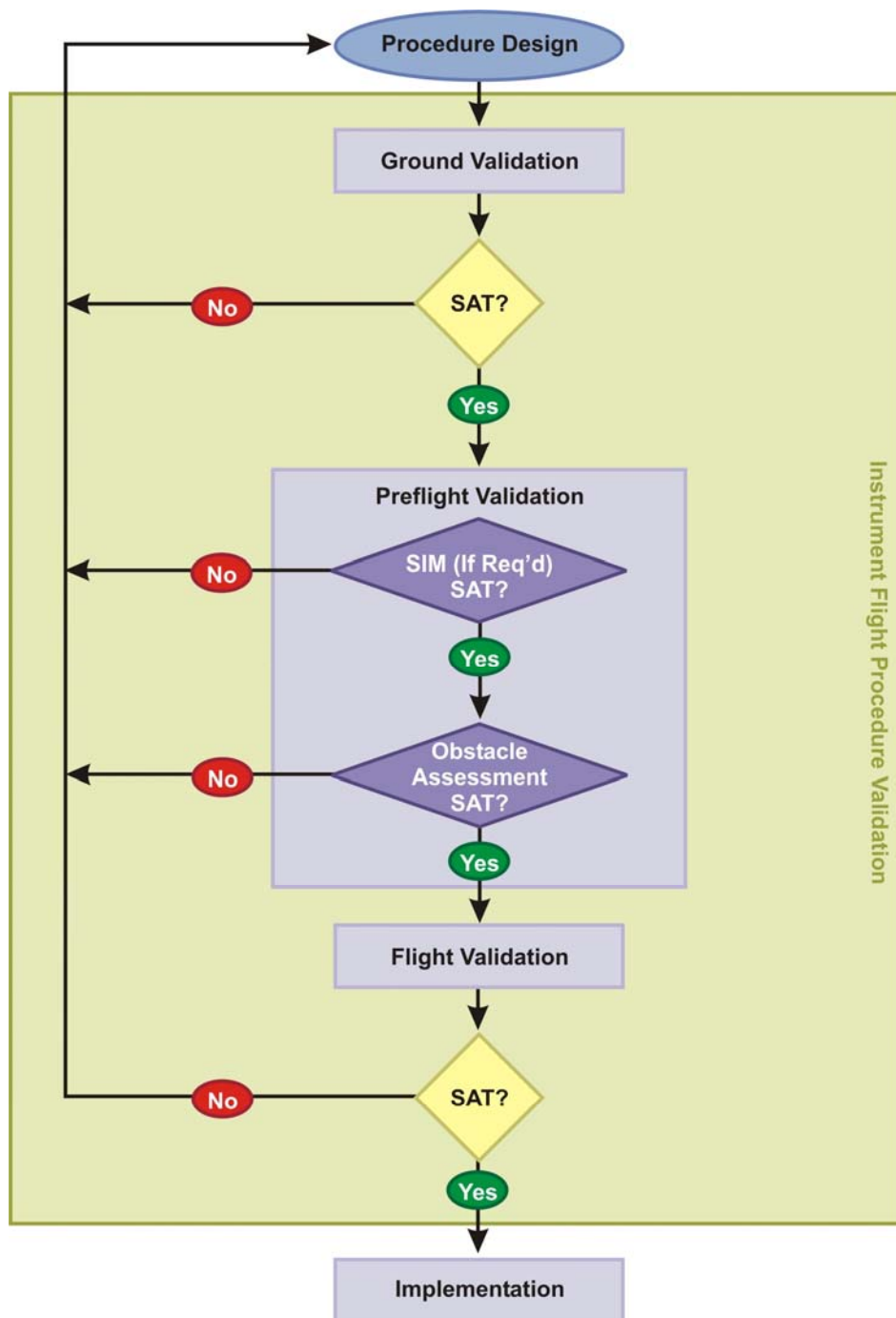
(2) Forward signed copies of FAA Forms 8260-30B to AFS-460 at AFS460IFPV@faa.gov upon the completion of a periodic (540-day) flight validation.

f. Personnel training records related to IFPV.

g. Individual and company IFPV letters of authorization.

h. Any additional items listed in the IFPV service providers operations manual.

Figure A-1. IFPV Process Flow



Note: Some of the steps may not be required or may be accomplished in a different order.

Appendix B. IFPV Service Provider Requirements

1. Operational Guidance. The service provider (organization) must have AFS-460 accepted guidance (e.g., Operations Manual) describing the processes and policies the service provider will follow when conducting IFPV activities. The guidance must, as a minimum, contain the following information:

a. General information containing:

- (1) Contact person/persons in charge and physical address of all saved records.
- (2) List of individuals authorized to conduct IFPV and their relevant endorsements (simulator evaluation, ground obstacle assessment, airborne obstacle assessment, and flight validation).
- (3) Process for periodic internal audits.
- (4) Process for communicating and coordinating with appropriate FAA offices to include the transfer of data, forms, and documents.
- (5) Process for acquiring and maintaining regulatory guidance material associated with each authorized function, to include processes for maintaining the currency of all reference material.
- (6) Process to ensure all personnel authorized to perform IFPV activities are current and trained in accordance with current IFPV guidance.
- (7) Training attendance, including recurrent training documentation.
- (8) Process for ensuring that all IFPV processes are approved and current.
- (9) Procedures for revising the operations manual.

b. Ground Validation information containing performance-based navigation IFP quality assurance review process (outline internal review process).

c. Preflight validation information containing:

- (1) Simulator Evaluation Process.
 - (a) Quality assurance review process for correct coding of the PBN or WAAS IFP of navigation databases used within area navigation (RNAV) equipment and systems including Flight Management System (FMS) [outline process used to compare and ensure matching data].

(b) Satellite-based RNAV simulator use requirements (i.e., methodology as to when a simulator check would be completed or required for a non-SAAAR IFP).

(2) Obstacle assessment process, to include accuracy codes achievable using company specific equipment and process.

(a) Ground obstacle assessment information (if applicable) containing:

1 Complete equipment list (hardware) to include type, make, model, and software version, and revision if applicable (e.g., GPS Receiver – Global Sat BU-353).

2 Complete equipment list (software) to include software manufacturer, title, version, and purpose (e.g., Magellan Mobile Mapper Office, release 3.40A) used to post process recorded GPS data.

3 Step by step process for obstacle verification.

4 Process for ensuring any new or different obstacles identified during ground obstacle assessment are documented and IFP re-evaluated, if necessary.

(b) Airborne obstacle assessment information (if applicable) containing:

1 Complete equipment list (hardware) to include type, make, model, and software version, and revision if applicable (e.g., GPS Receiver - Global Sat BU-353).

2 Complete equipment list (software) to include software manufacturer, title, version, and purpose (e.g., CSSI, TARGETS Version 4.8) used for in-flight referencing of controlling obstacles and recording obstacle assessment tracks.

3 Step by step process for obstacle verification.

4 Company specific Obstacle evaluation area (OEA) evaluation processes, if applicable.

5 Process for ensuring any new or different obstacles identified during an airborne obstacle assessment are documented and IFP re-evaluated, if necessary.

6 Process for briefing pilots, without IFPV authorization, on airborne obstacle assessment mission (e.g., briefing the pilot of a rented helicopter).

d. Flight Validation information containing:

(1) Quality assurance review process of IFP Chart, FAA 8260-series forms comparison and Navigation database (outline process used to compare and ensure matching data).

- (2) Complete flight validation equipment list (hardware) and software version and revision if applicable, e.g., GPS Receiver - Global Sat BU-353.
- (3) Complete equipment list (software) to include software manufacturer, title, version, and purpose (e.g., TARGETS version 4.8) used for recording flight tracks.
- (4) Process for addressing issues concerning obstacles or flyability discovered during flight validation.
- (5) Process for assessing airport/heliport infrastructure.

2. Safety Management System (SMS)/Operational Safety Assessment (OSA). The SMS/OSA must define the safety policies, processes, and practices for managing all aspects of all IFPV processes. The SMS/OSA must include the following elements:

- a. Definition of the organization's safety objectives.**
- b. Ability to present the safety situation** in respect to compliance with all relevant FAA, internal, and other safety related standards.
- c. Definition of the safety accountabilities** of all personnel.
- d. Continual review process** for effectiveness by all personnel.
- e. A process for staff to identify safety hazards** or concerns and to suggest methods for enhancement of safety.
- f. Established internal procedures for the communication** and processing of safety concerns within the organization as they relate to IFPV.
- g. Definition of the interface arrangements** between internal groups of the organization as they relate to IFPV.
- h. A compliance process applicable** to all personnel of the organization.
- i. A quality management system** based on those elements of ISO 9001 relevant to IFPV.
- j. An oversight and audit program.**

Note: The SMS/OSA guidance will be located in the Operational Guidance referenced in appendix B, paragraph 1.

Appendix C. Instrument Flight Procedure Validation (IFPV)

1. Process. IFPV consists of three elements: ground validation, preflight validation, and flight validation. Ground validation is a review of the entire instrument flight procedure package. It is meant to identify areas with the potential to impact the flyability and safety of the IFP. Issues identified during the ground validation phase must be addressed prior to the preflight validation phase. Preflight validation will include an obstacle assessment and may include a simulator evaluation. Any issue identified during the preflight validation phase must be addressed prior to flight validation. Flight validation is the final in-flight assessment of an IFP to confirm that the procedure is operationally safe. Flight validation verifies the required obstacle clearance, flyability, navigation database ARINC 424 coding, design accuracy and required infrastructure (i.e., communications, approach lights, runway markings, runway lights, charting, etc.) with all supporting documentation.

a. Ground Validation. Perform a quality assurance review of the PBN IFP to ensure its design and documentation are compliant with existing criteria.

b. Preflight Validation.

(1) Determine any special operational issues specific to the IFP e.g., climb gradients, close proximity to restricted areas, speed limits, etc.

(2) Verify the RNAV navigation database for correct coding of the PBN or WAAS IFP. Comparisons must be made between the RNAV or FMS navigation data as displayed on the control display unit and the applicable FAA 8260-series forms. Additionally, any notes and/or charted requirements and restrictions such as altitudes, speeds, courses, etc. must be validated.

(3) Conduct a simulator evaluation (fixed wing only) testing the procedures flyability and comparing database coding. All required navigation performance (RNP) special aircraft and aircrew authorization required (SAAAR/AR) IFP (fixed wing only) require a simulator evaluation, unless waived by the Flight Procedure Implementation and Oversight Branch (AFS-460). Simulator evaluations of other IFP should be conducted where evaluation of special design or operational conditions are desired. All areas listed on FAA Form 8260-30A, Simulator Evaluation Checklist, should be evaluated. Provide feedback to the procedure designer who, if feasible, should be involved in the simulator evaluation. The simulator evaluation must be conducted in a FAA-qualified Level “C” or Level “D” flight simulator capable of flying the procedure.

Note: For Special PBN IFP that are designed for a specific make/model/series and specific FMS, software part number, software version, and revision, the simulator evaluation must be flown in an FAA-qualified Level “C” or Level “D” simulator with the exact configuration specified above in this note.

(4) Conduct an obstacle assessment verifying the height and location of the documented controlling obstacle for each segment of the IFP. Perform a visual inspection of the obstacle evaluation area (OEA) to determine the presence of undocumented or inaccurately

documented obstacles. Obstacle assessment must be performed in accordance with FAA Order 8200.1 and must be documented on FAA Form 8260-30B.

(a) A Ground obstacle assessment can produce the most accurate results; however, circumstances may prevent obstacle access.

(b) An airborne obstacle assessment provides easier access to obstacles and OEA boundaries. Airborne obstacle assessments can be flown in any type of aircraft; however, assessments performed in helicopters or slow moving/small category aircraft are preferred. Obstacle assessment flight activities must comply with the flight rules contained in Title 14, Code of Federal Regulations (14 CFR), Part 91. Any deviation from a rule during an obstacle assessment (e.g., 91.119 minimum safe altitudes – general) must be authorized by the geographically respective Flight Standards District Office. Consistent with FAA Order 8260.19, an airborne obstacle assessment will result in an accuracy code of 4D being assigned to that obstacle.

(c) Document incorrect obstacle data such as obstacles that no longer exist or obstacle data that is inaccurate or is missing from the FAA obstacle databases. This information must be provided to the IFP designer and documented on the 8260-30B. All supporting information including photos, survey data, etc. must be retained by the organization. Obstacle data inaccuracies, of any type, must be documented and accuracy codes assigned in accordance with FAA Order 8260.19.

(d) If desired, a lower accuracy code specific to the process used by the IFPV provider may be coordinated with AFS-460. This authorization is specific to both the company and the individual performing the obstacle assessment. This accuracy code determination will be based upon the type of equipment used, its specifications, and a determination of process effectiveness.

c. Flight Validation (FV).

(1) Review the results of the simulator and obstacle evaluations, and review any specific training, operational, or equipment requirements.

(2) Review the PBN IFP package per guidelines established in Order 8200.1.

(3) Compare the aircraft navigation database, chart depiction, and appropriate FAA 8260-series forms.

(4) Conduct an assessment of flyability to determine that all segments of the procedure can be safely flown considering required speeds, descent angles, climb gradients, etc. Flight validation must be conducted on-course / on-path and must be flown at or below the maximum intended speed on the developed lateral and vertical flight path. Flight validation must be accomplished in an aircraft capable of flying the procedure as designed.

Note 1: Exercise caution when evaluating a procedure where a ground-based NAVAID is used. Instrument procedures are developed using the airport's magnetic variation. When flight procedures are coded, there may be a difference between the ARINC airport and the NAVAID magnetic variation record.

Note 2: If a NAVAID is used solely as a waypoint (latitude/longitude coordinates only), a flight validation is necessary for the flyability of the fix in the procedure design. If the electronic portion of the NAVAID is required to fly the procedure, a flight inspection of the signal must be performed by FAA Flight Inspection.

(5) Conduct a controlling obstacle verification to provide the final assurance that the controlling obstacle has been correctly identified for each segment.

(6) Verify that all airport/heliport infrastructures, such as runway markings, lighting, and communications, are in place and operative as per FAA Order 8200.1.

(7) Evaluate other operational factors, such as aircraft equipment, performance limitations, and human factors.

(8) Document the Flight Validation on the FAA Form 8260-30C, Flight Validation Checklist.

(9) Flight Validation must not be conducted during revenue operations.

2. Requirements.

a. Preflight Validation.

(1) Personnel.

(a) Simulator evaluation. In order to conduct a simulator evaluation, the designated evaluator must hold an LOA for simulator evaluation. Although preferred, there is no requirement for the LOA holder to be a pilot. However, if the simulator evaluator is not a pilot, an experienced pilot must accompany the LOA holder to provide an accurate assessment of flyability. For Special IFP designed for a particular airframe, FMS, software part number, software version, and revision, the pilot assisting in that evaluation must have experience in that particular aircraft and its flight guidance and navigation system.

(b) Ground obstacle assessment. In order to conduct a ground obstacle assessment, the designated evaluator must hold an LOA for ground obstacle assessment.

(c) Airborne obstacle assessment. In order to conduct an airborne obstacle assessment, the designated evaluator must hold an LOA for airborne obstacle assessment. If the designated evaluator is not also the PIC, the evaluator must provide an AFS-460 approved mission brief to the pilot.

(2) Weather. Airborne obstacle assessments must be conducted during day visual meteorological conditions (VMC) with sufficient in-flight ceiling and visibility to accomplish the assessment of obstacles.

b. Flight Validation.

(1) Personnel. The minimum crew complement is two pilots.

(a) Pilot-in-Command (PIC) must be:

1 Current and qualified in the appropriate aircraft and proficient with the specific FMS and associated software part number, software version, and revision.

2 Approved by AFS-400 or has received an AFS-460 approved brief.

(b) Second-in-Command (SIC) (if required) must be:

1 Current and qualified in the appropriate aircraft and proficient with the specific FMS and associated software part number, software version, and revision.

2 Approved by AFS-400 or has received an AFS-460 approved brief.

(c) Flight Validation Evaluator. Although not required to be a crewmember, the evaluator may act as the PIC or SIC in accordance with the requirements above. The Flight Validation evaluator must be:

1 An FAA Aviation Safety Inspector (Operations) approved by AFS-460,
or;

2 An individual with similar pilot qualifications who has completed AFS-460 approved training (see appendix D) and received a Letter of Authorization from AFS-400, or

3 A current and qualified Aviation System Standards Airspace System Inspection Pilot (ASIP).

(2) Weather. Flight Validation must be conducted during day visual meteorological conditions (VMC) with sufficient in-flight ceiling and visibility to accomplish the assessment of obstacles and determine that the procedure flight track reflects the IFP design.

(a) Portions of the procedure above a published minimum IFR altitude (e.g., high-level portions of Standard Instrument Departures or Standard Terminal Arrival Routes) may be flown at night and/or in Instrument Meteorological Conditions (IMC).

(b) Approval of night minimums – A night evaluation is required when an IFR procedure is developed to an IFR or VFR airport/heliport with no prior night IFR service. An evaluation is also required when a procedure is developed to a newly constructed runway or when an existing procedure serves a runway that has been lengthened or shortened. The purpose of the evaluation is to determine the adequacy of airport lighting systems prior to authorizing night minimums. Conduct all night evaluations during VMC with sufficient in-flight ceiling and visibility to assess the airport infrastructure.

(3) Flight validation must not be conducted during revenue operations.

3. When conducting Flight Validation of WAAS IFP utilize an in-flight data collection system that enables in-flight or post-flight analysis to validate that FAS data elements for course alignment, threshold crossing height, and glide path angle are providing navigation guidance, as designed, to the physical runway threshold or point-in-space. Particular attention should be paid to data accuracy in the precision FAS data block for corruption of ellipsoid height data. The system must be capable of performing the necessary evaluations in a documented, quantitative fashion.

Appendix D. IFPV Evaluator Training Requirements

Note: See paragraph 2 of this Appendix for a description of the entire authorization process.

1. Initial Training Requirements for IFPV Authorization. To receive an LOA for any IFPV activity, an evaluator applicant must first attend an AFS-460 approved training program that includes the following:

a. Familiarity with the PBN IFP design process and requirements for PBN operations. The requirements for PBN operations are outlined in the following FAA documents:

- (1) AC 90-100, U.S. Terminal and En Route Area Navigation (RNAV) Operations.
- (2) AC 90-101, Approval Guidance for RNP Procedures with SAAAR.
- (3) AC 90-105, Guidelines for using Global Positioning System Equipment for IFR En Route and Terminal Operations and for Nonprecision Instrument Approaches in the U.S. National Airspace System.
- (4) AC 120-40, Airplane Simulator Qualification.
- (5) AC 150/5300-16, General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey.
- (6) AC 150/5300-17, General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition and Submission to the National Geodetic Survey.
- (7) AC 150/5300-18, General Guidance and Specifications for Aeronautical Surveys to NGS: Field Data Collections and Geographic Information System (GIS) Standards.

b. Knowledge of the procedure design criteria relevant to the type of IFP for which the individual is authorized to conduct as either pilot-in-command or evaluator. IFP design criteria are outlined in the following FAA documents:

- (1) AC 150/5300-13, Airport Design.
- (2) Order 7100.9, Standard Terminal Arrival Program and Procedures.
- (3) Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).
- (4) Order 8260.19, Flight Procedures and Airspace.

- (5) Order 8260.42, United States Standard for Helicopter Area Navigation.
 - (6) Order 8260.44, Civil Utilization of Area Navigation (RNAV) Departure Procedures.
 - (7) Order 8260.52, United States Standard for Required Navigation Performance (RNP) Approach Procedures with Special Aircraft and Aircrew Authorization Required (SAAAR).
 - (8) Order 8260.54, United States Standard for Area Navigation (RNAV).
- c. Training in the operation and post processing of data (only for flight validation crews).**
 - d. Process of completing FAA Forms 8260-30A, 8260-30B, and 8260-30C; and the process for providing feedback to the procedure designer; For 8260-30 forms, see FAA Order 8900.1, Volume 11, chapter 12.**
 - e. Flight Validation requirements.**
 - f. Procedure package review.**
 - g. Requirements, techniques, and considerations for verifying that the navigation data to be published, as well as that used in the design of the procedure, is correct.**
 - h. Techniques and considerations for validation of obstacle data.**
 - i. Airport infrastructure assessment.**
 - j. Communications coverage.**
 - k. Flyability/human factors assessment.**
 - l. Use of automation tools and simulators or ground validation.**
 - m. Charting considerations.**
 - n. Operational factors.**
- 2. Recurrent training requirements.** In order to exercise the privileges of the IFPV LOA, each evaluator must attend AFS-460 approved training within 24 months of the last training event. Training will consist of, at a minimum, the following:

- a. Updates on relevant changes to design criteria.**
- b. Knowledge and skills related to new developments in IFPV.**
- c. Review of required IFPV skills.**

Note: In the event an evaluator's LOA expires, AFS-460 will determine the training requirements to re-qualify.

Appendix E. Example of a Briefing for Non-IFPV Authorized Pilots

1. Introduction.

- a. Operator's Pilot in Command (PIC)** is responsible for all aspects of the flight.
- b. IFPV personnel will not ask** or require them to do anything outside the regulations or their operations specifications.
- c. Comply with operator policies and procedures.**

2. Mission.

- a. IFP locations** – cover all scheduled validation locations and intentions.
- b. Discuss procedure legs, altitudes, and airspeeds to be flown** (i.e., initial, intermediate, final, missed approach, and holding).
- c. Discuss, if the OEAs are to be flown**, how they will be flown, who will define the track to be flown, etc.
- d. If an airborne obstacle assessment** is to be flown, discuss how it will be flown.
- e. Discuss a proposed route for efficiency**, air traffic control, weather, fuel locations, and other operational needs.
- f. Cover the manner in which the flight validation will occur.**

3. Operating Rules.

- a. Title 14, Code of Federal Regulations (14 CFR), Part 91.**
- b. Flight Plan Type.** Visual Flight Rules (VFR) and/or Instrument Flight Rules (IFR) operations are authorized during IFPV activities. However, the weather at the location of the IFPV activity must meet the requirements of this chapter. Visual Meteorological Conditions (VMC) are MANDATORY during obstacle evaluation, night evaluation, VFR area evaluation, visual segment evaluation, and departure procedure evaluations.
- c. Weather – VFR / IFR**, Departure, En Route, Destination, Alternate.
- d. NOTAMs – Departure**, En Route, Destination, Alternate.
- e. Temporary Flight Restrictions.**
- f. Emergencies – during an emergency** the flight validation will terminate immediately.

4. Company/Operator Requirements.

- a. PIC will follow all** company/operator requirements.
- b. There will be no pressure** to operate outside the company/operators rules.
- c. PIC follows company/operators** flight following rules.

5. IFPV Requirements.

- a. Will comply with FAA IFPV requirements.**
- b. Brief the crew to ensure understanding** and comfort with the mission requirements.

6. Post Mission. Obtain/verify contact information for the Chief Pilot, Director of Operation, Principal Operations Inspector, and All Weather Operations individual (if possible).